Met Office

Volcanic lightning could help monitor volcanic eruptions

14 December 2010 - Research by Met Office scientists suggests that the amount of lightning produced near a volcano each hour can provide a method of rapidly alerting forecasters to potential increases in eruptive activity of volcanoes around the world.

The Met Office's recently upgraded long-range lightning-location network (ATDnet) was used to assess the number of lightning strokes produced during the explosive eruption of the Eyjafjallajökull volcano in Iceland earlier this year and was found to be roughly proportional to the ash plume height.

Enlarge

Such a finding is useful because volcanoes in many parts of the world are not conveniently located next to radar systems, like those used by the Iceland Meteorological Office. As such, early identification of volcanic plumes and real-time monitoring of plume heights above remote volcanoes could be achieved by combining long-range lightning location networks such as ATDnet with other remotely-detected measurements such as seismic activity and satellite-based observations.

Alec Bennett of the Met Office said: "The eruption of Eyjafjallajökull in April and May 2010 provided an excellent opportunity for us to study both the performance of ATDnet after recent network upgrades, and to use the lightning data to learn more about the relationship between volcanic activity and plume electrification. A process recognised for decades but still subject to ongoing scientific debate.

"ATDnet is used to monitor thunderstorms over a vast area of the world extending from the US to China and the Arctic to the South Atlantic, centred over the UK. This new technique could ultimately be used to monitor volcanoes in remote locations or those that are obscured by rain."

The new findings published in Environmental Research Letters by researchers from UK Met Office and Icelandic Meteorological Office found that plumes from Eyjafjallajökull that reached about 5 km above sea level generated lightning strong enough to be detected by ATDnet. Above this threshold, the rate of lightning production was approximately proportional to the plume height.

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